



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,244	12/01/2003	Shu-Hui Liu	NTCP0009USA	1243
27765	7590	07/17/2006	EXAMINER	
NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION			LEVIN, NAUM B	
P.O. BOX 506			ART UNIT	PAPER NUMBER
MERRIFIELD, VA 22116			2825	

DATE MAILED: 07/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/707,244		LIU ET AL.	
	Examiner		Art Unit	
	Naum B. Levin		2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to application 10/707,244 and Amendment filed on 05/22/2006. Claims 1-7 remain pending in the application.

Claim Rejections - 35 USC § 112

2. Claim 1 recites the limitation "the first assist feature" in line 9. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-7 are rejected under 35 U.S.C. 102(e) as being unpatentable by Liebmann et al. (US Patent 7,001,693).

4. As to claim 1 Liebmann discloses:

(1) An optical proximity correction (OPC) method for correcting a photomask layout, wherein the photomask layout comprises at least a photomask pattern, the OPC method comprising:

collecting an assist feature bias of a predetermined first assist feature which will be added to the photomask layout (Next in step 104, the function is to apply bias to the circuit features for the mask as a function of main feature spacing according to the

SRAF rules stored in tables 106 of SRAF rules ... The rules in tables 106 relate to the placement of SRAF elements adjacent to main pattern features such as horizontal pattern bar H1 and vertical pattern bars V1/V2 as a function of the SRAF rules. The SRAF rules in the SRAF rules table relate to sizes and placement of SRAF elements, as well as biasing of the main pattern features ... – col.12, ll.51-61) (col.8, ll.60-62; col.10, ll.60-67; col.11, ll.1-58; col.12, ll.51-61);

performing a rule-based OPC process by taking account of the assist feature bias to compute a target bias of the photomask layout (The flow chart shown in FIG. 4 is based upon a completely Rules-Based approach to designing a photolithographic mask in which primary mask feature biases as well as assist features are applied based on primary feature spacing directly from a rules table, which are illustrated by TABLE I above – col.12, ll.31-37; the SRAF rules in the SRAF rules table relate to sizes and placement of SRAF elements, as well as biasing of the main pattern features to compensate for proximity effects as a function of spacing of the main pattern features – col.12, ll.59-62; fig. 8 is a flow chart illustrating an application of Binary OPC steps to the Rules-Based SRAF elements, which incorporates main feature sizing as part of the SRAF design, which is a modification of the flow chart of FIG. 4, with the addition of steps 112 and 114 – col.16, ll.21-27) and output a corrected photomask layout according to the target bias (In step 112, the CAD system must apply rules to determine which edges of which pattern features and which SRAF elements of the current design of the mask being developed by the CAD system are at risk of being spaced too far apart and therefore require performance of the proximity correction function of this

invention. Thus in step 112, the CAD system identifies such an edge and provides an output to the next step 114 – col.16, ll.46-53) (col.8, ll.45-48; col.12, ll.31-38; col.12, ll.51-67; col.13, ll.1-6; col.16, ll.21-53); and

adding the first assist feature to the corrected photomask layout (process is continued until all features within the design have been analyzed (In step 114, "Apply a selected bias to the problem edge segments to modify the mask pattern locally in areas of SRAF-loss" a secondary rules-based proximity correction step is performed - col.16, ll.55-58) (col.16, ll.54-67).

4. As to claims 2-7 Liebmann recites:

(2) The OPC method, wherein the first assist feature is a scattering bar (col.3, ll.44-51; col.12, ll.51-62);

(3) The OPC method further comprising using the collected assist feature bias to build an assist feature correction model for the rule-based OPC process (col.8, ll.45-48; col.12, ll.31-38; col.12, ll.51-67; col.13, ll.1-6; col.16, ll.21-53);

(4) The OPC method further comprising transferring the collected assist feature bias to a specific format for the ruled-based OPC process (col.7 ll.41-53; col.12, ll.9-12);

(5) The OPC, wherein the rule-based OPC process is used for correcting an edge portion of the photomask pattern (col.7 ll.41-53);

(6), (7) The OPC method, wherein the rule-based OPC process comprises collecting a width and a spacing and adding a second assist feature wherein the second assist feature is a serif pattern (col.11, ll.59-67; col.12, ll.1-9; col.12, ll.51-67; col.13, ll.1-6; col.19, ll.35-51).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Naum B. Levin whose telephone number is 571-272-1898. The examiner can normally be reached on M-F (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Chiang can be reached on 571-272-7483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

N L

Thuan Do
THUAN DO
Primary Examiner.
07/13/2006